Introduction of Forage Choppers in Livestock Production Systems in Tanzania

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Abstract

Future intensive and sustainable livestock production systems, requires a thorough knowledge of the potentials and limitations of the system. Forage availability is one of the important factors determining the potential of a given ruminant livestock production system. It is more important in intensive and semi-intensive systems where livestock are zero grazed.
A project is conducted in livestock systems in Arumeru District aimed at improving forage availability by introducing a forage chopper. The methodology used to introduce the choppers involved four stages: i) exploratory survey, ii) training workshop iii) dissemination and iv) monitoring and evaluation.The use of the forage chopper has: i) improved the efficiency of forage utilization about 75% ii) reduced labour required for forage gathering more than 50% and iii) reduced women's labour. The project has also created awareness of the existence of the technology for forage handling and identified possibilities for improving the technology. The positive response to the technology is an indication of the existence of a high potential for improving the intensive and semi-intensive livestock systems through the introduction of labour saving technologies.

Key words: Technology, livestock production systems, forage chopper, women's labour.

Introduction

Livestock sub-sector contributes 30% of the agriculture sector (second largest share after food crops). Overall it contributes 18% of the National GDP (URT, 1997). According to the 1994/95 national sample census of livestock 8% of households in Tanzania depend on livestock as their main source of income. Livestock population in Tanzania is estimated at 15.6 million cattle, 10.7 million goats, and 3.5 million sheep. Of the 15.6 million cattle 90% are indigenous, while about 2% are improved type of breeds (URT, 1997). More than 90% of improved dairy cattle are found in 6 regions, Kilimanjaro, Arusha, Kagera, Dodoma, Tanga and Mbeya.

Arusha region is the highest milk producer of the country. It produces about 18% of all the milk in the country (URT, 1998a). About 72% of the households in the region are livestock producers. Mixed farming is the most common system of production and is practiced by about 71% of all the households in the region.

This paper presents an experience in overcoming technology constraints in livestock production systems. It is based on a project conducted in Arumeru District of Arusha region. In this high potential area land for agricultural production is a very limited resource. This has resulted in shortage of grazing land. For this reason livestock keepers main concern is to improve fodder availability through proper/efficient handling.

Methodology

Project Area

A project aimed at addressing the forage handling constraint in livestock systems was introduced in four villages in Arumeru District in Arusha Region. Two villages, Ndoombo and Ulong'a were selected from highland and Mareu and King'ori from the low land area. The highland and lowland areas differ significantly in forage and land resource availability. Land is scarcer in the highland as compared to the lowland. However, some farmers in highland area own land in the lowland area (ICRA, 1992). It is therefore common site to see farmers carrying forage from lowland fields to feed livestock in the highlands.

Objectives

The overall objective of the project is to introduce the forage chopper in the livestock systems, to alleviate forage-handling problems and consequently, improve forage availability. Specific objectives are to:

i) Create awareness of the existence and advantages of the forage chopper among livestock keepers in Northern Tanzania.
ii) Encourage and promote the use of the forage chopper among livestock keepers in Northern Tanzania.
iii) Assess the acceptability of the forage choppers in the livestock systems.
iv) To provide necessary recommendations for the improvement and development of the forage chopper and other technologies to meet the livestock keeper needs.

Data collection

The project was implemented in 4 main stages:

- Exploratory survey
- Training workshops

Dissemination and Monitoring and evaluation

This paper is based on the results of the monitoring and evaluation stage. Throughout the project period, the participating farmers were visited regularly by researches and technicians, to monitor the performance of the forage choppers. At the end of the project an evaluation workshop was held to assess the performance of the forage chopper and acceptability to participating farmers.

Results and Discussion

Livestock system of the project area

In the study area, intensive system of livestock production is the most common system. Improved dairy cattle breeds characterize the system. About 95% of project participants owned exotic breed (Survey Report, 1997). The average number of dairy cattle kept per household is about five. Other livestock kept include goats and sheep. On average a household owned 2 goats and 5 sheep.

About 95% of participating farmers practice stall-feeding system. Ninety percent of them, ranked grasses as the first important forage used. Crop residues, mainly maize stover, and bean straw is the second important feed. Other feed resources used include concentrates, banana leaves and pseudo-stems.

Fodder crops are grown in part of cropping land. Fodder crops are also grown in plot borders, and contours in crop fields. About 40% of participants purchase forage at times of shortage. Crop residues are obtained from own field or purchased. More than 70% of participants stored crop residues for at least six months.

Forage availability constraints

Forage availability is seasonal, green fodder is very scarce during the dry season. As such, the majority of farmers use stored crop residues. Farmers identified three main constraints associated with forage utilization: i) inadequate storage facilities ii) forage losses and iii) inadequate technologies for handling forage. The main storage methods are (i) stacking (in the field) (ii) piling on a raised floor, outside a house and (iii) heaping in small rooms near livestock sheds. With these methods, farmers reported high insect and mould infestation, resulting to forage losses of up to 50%. The bulkiness of the forage forces them to adhere to these methods. Losses are also a result of inefficient consumption by livestock due to large sizes of cut forage. These account for about 1/3 of forage that is trampled and thrown out in the field as waste.

Technologies in Livestock Systems

Improved cattle breeds

Traditionally, in northern Tanzania large numbers of local cattle breeds were kept. Improved cattle breeds were later introduced, with the aim of improving livestock productivity. It is estimated that between 1991 and 2000 indigenous breeds in Arusha decline by 0.2%, whereas improved dairy and beef cattle breeds increase by about 6% and 4% respectively (URT 1998b).

Improved cattle breeds especially dairy cattle were attractive because of cash income generated through milk sales. This was important because coffee returns were declining (BoT 1998). Improved cattle breeds were accepted also because the demand for land, (a limiting resource) was low. This technology, however, increased labour demand in the system, especially that of women.

Labour Demand for Improved Cattle

Yield increasing, input intensive technologies increase demand for farm labor and frequently increases demand on women's labour (Lawrence *et al.,* (1999). In traditional pastoral and agro-pastoral system in northern Tanzania, grazing of livestock is men's responsibility. Women take care of calves, and livestock that remain at home for any reason that they cannot graze. The fact that the improved breeds are not taken for grazing, they became a responsibility for women. The main activity is feeding the livestock (Kurwijila and Mdoe 1992).

Livestock feeding involves forage gathering, carrying from the source to the homestead, cutting/chopping, fill up of the troughs, and clearing forage leftovers (carrying and spreading in home gardens). This process in some households is repeated twice a day. This is very tedious and time-consuming job, especially because of the type of technology used.

Technologies for Forage Handling

Farmers use simple hand tools in handling forage. Forage transportation is largely done by head-loads. Vehicles or wheelbarrows are rarely used. A sickle and to a lesser extent a cutlass (*Panga*) are used in harvesting /gathering grass. Sometimes long handles are used in both the sickle and cutlass to allow cutting of banana leaves which cannot be reached by a normal sickle or cutlass. The cutlass is the main tool used to cut/chop forage before feeding to the livestock. These tools make forage handling tedious and leads to high losses. With the improved breed technology, a labour saving technology for forage handling is necessary.

Forage Chopper Technology

Forage chopper is used to cut/chop forage as a replacement of a cutlass (*panga*). The chopper is manual driven using a chain and handle. Lack of cash and exposure

were cited as reasons for not having and using forage choppers. For this reason a credit scheme and training workshops were designed.

The evaluation workshop results showed acceptance of the forage chopper technology in the study area. Farmers evaluated the forage chopper positively in terms of utilization, labour requirement, and women's workload. They indicated that by using the forage chopper forage utilization improved by about 75%, labour requirement for forage gathering is reduced by more than 50% and women's workload is reduced significantly. Compared to the use of cutlass (*Panga*) the forage chopper made it possible to cut/chop forage into very small pieces that could easily be eaten by livestock. This process reduced forage losses through trampling by about 75%. As a result of this less forage was gathered. This implied reduced labour in terms of energy, time, and cost for those using hired labour.

In the lowlands where much of maize stover is used during dry season, farmers reverted to collecting maize stover that were discarded and spread in coffee fields to be chopped (by the forage chopper) and fed to cattle. This technology was of particular advantage to women because of their responsibility for livestock feeding. By having the forage chopper women spent less time in forage gathering and cutting/chopping. The introduction of forage chopper encouraged men and children to assist in forage chopping.

Labour Saving Technology: Opportunities and constraints

Despite the positive evaluation of the forage chopper farmers suggested to improve the forage chopper from a manual driven to a power driven chopper. This has a cost implication but farmers indicated willingness to pay the extra cost. This is a positive indication that farmers are willing to pay more for a more efficient technology. As was noted by FAO (1986) that "Smallholder farmers are receptive to change".

The main constraints identified for technology transfer include cost, availability, gender considerations and awareness. There is a limit to what farmers can pay for technology. Thus, for any technology to be accepted, the associated cost must be taken into consideration. This suggests for a form of credit scheme to allow them to acquire the technology within their financial means. Credit has an important role to play in technology transfer to cash trapped farmers. Although the experience from this project may not be a generalization to other cases, the rate of loan/credit repayment can be as high as 70% as long as farmer circumstances are taken into consideration.

The results of this project show that labour saving technologies are not readily available to farmers. Awareness among farmers of existing technologies is low. There is a general lack of information flow between manufactures and users (farmers). Efforts should be made to bridge this gap and promote information flow. Manufacturers should look into special needs of the end users of technology. Men and women may have different needs. Women in the project area for example, pointed to the problem of operating the forage chopper.

Whereas improved technology can enhance production and probably lower cost, an effective and sustainable transfer of production technology should also be linked to other activities such as marketing (utilization of the product). It is noted that promotion of production without proper linkages with marketing was a major limitation to further technologies uptake.

Conclusion and Recommendations

Technology characteristics

Based on the project findings technology characteristics which influence farmers acceptance are:

i) Efficiency of the technology compared to their traditional tools.

ii) The cost of the technology, both capital and operational. Where farmers are cash trapped introduction of credit system that address farmer circumstances.

iii) Easiness of operation by both men and women depending on gender roles

iv) Linkage with other institutions including markets

Recommendations

Based on the results of this project the following is recommended:

i) There is a high demand for more efficient technologies in livestock production systems. This calls for public and private manufacturers to pay more attention to needs of small holder livestock keepers. A thorough market research by manufactures will be a good starting point in identifying technology needs.

ii) Extension services should include issues of labour saving technologies in their programs. To create awareness among small holder livestock keepers.

iii) Given the low financial status of the majority of smallholder livestock keepers, a credit system is pre-requisite to encouraging them on the use of labour savings technologies.

iv) Farmers' technology evaluation should be part of technology development.

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